

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Carrier Current Systems, including Broadband over Power Line Systems)	ET Docket No. 03-104
)	
Amendment of Part 15 regarding new requirements and measurement guidelines for Access Broadband over Power Line Systems)	ET Docket No. 04-37

To the Commission:

I am responding to your Notice of Proposed Rule Making referenced above. I am representing myself, speaking as an electrical engineer in the military communications industry for 30 years, a licensed radio amateur, and a concerned citizen. Comments relate directly to the indicated paragraph numbers.

2 As indicated in this paragraph, carrier current devices such as those operated at school campuses, while unlicensed, are specifically designed to radiate to users not connected to the power line. This is a clear demonstration of the ability of power lines as radiating elements, not simply as conducting elements. Further, the systems noted are narrowband systems. Any interference can be mitigated by a change in frequency. Contrast this to BPL, which is broadband in nature and can cover the ENTIRE broadcast, or shortwave band.

Please contrast the nature of BPL with footnote 10 on page 4 which notes that narrowband AM signal interference avoids harmful interference by operating on frequencies not used. That only works (and Part 15 rules work for such operation) only for such narrowband (single carrier) signals.

3 Referencing my comments of paragraph (2) above, the signals of In-House BPL systems can be readily expected to be received by systems in such buildings, in an identical manner to that of college station systems. This contrasts with later statements that BPL does not interfere with licensed users. Further, Access BPL simply extends the same concept to a much wider area. My experience with college carrier current stations is that those systems can carry over power lines to buildings far removed from that where the transmitter is located, indicating that BPL will similarly impact a large area far from the emitter.

4, 6 Broadband signals are inherently radio signals. Radio signals are generally dealt with in two ways. One is to assign specific spectrum for their operation. The second is to contain them, such as in the closed, shielded cable of a cable TV system.

BPL is neither.

The system proposed for BPL puts signals such as those on cable TV systems (cable modems also use OFDM for DOCSIS) on power lines using frequencies that are NOT assigned or licensed for radio use. Although BPL users claim they "meet regulations", in reality, they are operating under unlicensed rules and the maximum allowable levels apply PROVIDED NO LICENSED SERVICES are affected.

This is where there is much controversy between BPL and shortwave radio users. This is because power lines are not shielded and radiate to any nearby licensed user. Shortwave users, such as Amateur Radio Operators, mobile, military, or other users rely on reception of very weak signals to communicate over long distances. The signal levels from BPL are sufficiently high to interfere with such licensed operation when in general proximity to such operation. This interference is explained here <http://www.arrl.org/bpl> with supporting data.

5 Broadband signals are simply that, broadband. Whereas licensed users in the HF frequency range that BPL operates use single frequencies (channels), BPL is composed of many hundreds or thousands of frequencies simultaneously. This poses a new challenge in regulatory coordination. When narrowband signals interfere with other narrowband signals, the users generally have the ability to use alternate frequencies (or channels). When signals such as BPL cause interference, the ENTIRE SHORTWAVE spectrum is subject to interference. There is no recourse for the licensed operator except to complain.

BPL companies tout their ability to use only certain frequencies, however, the basic fact is that this is new technology, and new problems are being identified. This is from both a technical standpoint (how much suppression can they achieve on unused frequencies) as well as from a regulatory standpoint (never before has such a wide range of frequencies in terms of percentage of bandwidth been regulated). The issue is that the problems with interference from broadband signals is so much more profound than that of single channels, that it is an entirely different problem of an entirely different magnitude as past systems.

12, 30 BPL is designed to bring Internet to households. However, licensed users such as Amateur Radio Operators are often those same households. While you mentioned the lonely person in Wyoming needing broadband access, the fact is that BPL systems are being deployed not in rural areas, but in urban settings where the interference potential is tremendously more intense. In my zip code of 52402 in Cedar Rapids, Iowa, there are over 200 Amateur Radio Operators, yet Alliant Energy is beginning deployment of BPL. This is "knocking out" a large number of licensed Amateur Radio stations. Conversely, should BPL operation be inhibited within interference range of all of these stations, then BPL will not be a viable Internet approach as the coverage area will be non-existent.

13, 14, 36 The potential impact to emergency communications capability such as Amateur Radio is that it may simply cease to exist in the future. This would be very bad for Homeland Security, Civil Defense, Weather storm spotting, Red Cross, and other public service communications supported by Amateur Radio.

15, 37, 48 Radio spectrum is a precious natural resource. This situation is similar to chemical and industrial users a generation or two ago. At that time, industry did not recognize (or admit) environmental problems until they actually occurred and became a national problem. It was the government that is required to step in and control that situation. BPL has the same impact on the radio spectrum.

20, 21 Proponents claim that interference is minimal to licensed users, and claim that there is no data to support "problems". This is simply NOT TRUE. The burden of proof must be on the BPL operators to show non-interference, not on licensed operators to complain. Lack of complaints does NOT constitute no technical issues of interference. There *IS* data and it shows that there is a tremendous problem. (see <http://www.arrl.org/bpl> or come to Cedar Rapids and talk to my friends near the BPL trial site). The power industry has already shown that it is may be unable to cope with its responsibility to protect licensed users. One company has taken the position that it is unable to satisfy the needs of incumbent radio users by simply stating it has done all it is able to do. (please see <http://www.arrl.org/news/stories/2004/04/22/2/>)

26, 41 The technical merits of "notching" frequencies has not been shown. In the Cedar Rapids area, several licensed Amateur Radio operators, including James Spencer, W0SR are near a trial BPL area. Amateur Radio frequencies are notched out by Alliant Energy in cooperation with Mr Spencer, however, his interference is such that radio operation is not possible at his residence.

From a technical standpoint, "notching" with OFDM signals simply leaves selected frequency carriers out of the modulator. However, no technical performance of the "notch" has been described by BPL suppliers. It is common in any amplifier for distortion to cause regeneration of signals. For two-tone signals, this is measured using IMD (Intermodulation Distortion) measurements. For multitone systems, this is measured using NPR (Noise Power Ratio). If their unpublished NPR values are in the 20 to 30 dB range (typical), this is far from claiming that "no radiation" occurs. In fact, the levels are reduced, but are still strong enough to cause harmful interference.

Note that in footnote 75 of the NPRM, the ability of OFDM to avoid frequencies of interference is indicated where noise disrupts one of its frequencies. This is irrelevant to the regulations, as this only applies to the desired OFDM system, not the outside, licensed user.

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